

# FIMER

YOUR BRAND, YOUR WELDING



## **USER MANUAL TM 236 PULSE SYNERGIC/GEN**

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**Istruzioni Originali**

**Original instructions**

**Übersetzung der Originalbetriebsanleitung**

**Notice originale**

**Manual original**

## USER AND MAINTENANCE MANUAL

Firmer S.p.A. would like to thank you for choosing this welding machine: if used according to the instructions reported in this user and maintenance manual, it will accompany you in your work for many years without any problem.

The manual is an integral part of the equipment and must always accompany the machine each time it is moved or resold.

The user is responsible for making sure the machine is complete and in good working order.

Firmer S.p.A. has the right to make changes at any time and without notice.

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# DECLARATION OF CONFORMITY



YOUR BRAND, YOUR WELDING

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DICHIARAZIONE DI CONFORMITÀ CE	DECLARACIÓN DE CONFORMIDAD CE	BEKREFTELSE OM OVERENSSTEMMELSE CE
CE DECLARATION OF CONFORMITY	DECLARAÇÃO DE CONFORMIDADE CE	OVERENSSTEMMELSESERKUERING CE
KONFORMITÄTSEKTLÄRUNG CE	FÖRSÄKRAN OM OVERENSSTÄMMELSE CE	
DÉCLARATION DE CONFORMITÉ CE	VERKLARING VAN CONFORMITEIT CE	YHDENMUKAISUUSVAKUUTUS CE

Si dichiara che l'apparecchio tipo  
We hereby state that the machine type  
Wir erklären, dass das Gerät Typ  
On déclare que la machine type  
declara que el aparato tipo  
Declara-se que a máquina tipo  
Vi försäkrar att maskinen av typ  
Verklaard wordt dat het apparaat type  
Vi bekræftelser, at maskinen type  
Vi erklærer, at maskinen type  
Todistamme etta laite mallia

MODEL **TM236**

è conforme alle direttive  
is in compliance with the directives  
den Richtlinien entspricht  
est conforme aux directives  
es conforme a las directivas  
é conforme as directivas  
ar i överensstämmelse med direktiven  
overeenkomstig de richtlijnen  
er i overensstemmelse med direktivene  
er i overensstemmelse med direktivene  
on yhdenmukainen direktiivissa

2006/42/CE  
2006/95/CE  
2004/108/CE  
2002/95/CE (RoHS)

è conforme alle norme  
is in compliance with the rules  
den Normen entspricht  
est conforme aux normes  
es conforme a las normas  
é conforme as normas  
ar i överensstämmelse med direktiven  
overeenkomstig de richtlijnen  
er i overensstemmelse med direktivene  
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on yhdenmukainen direktiivissa

EN60974-1  
EN60974-10

MILANO

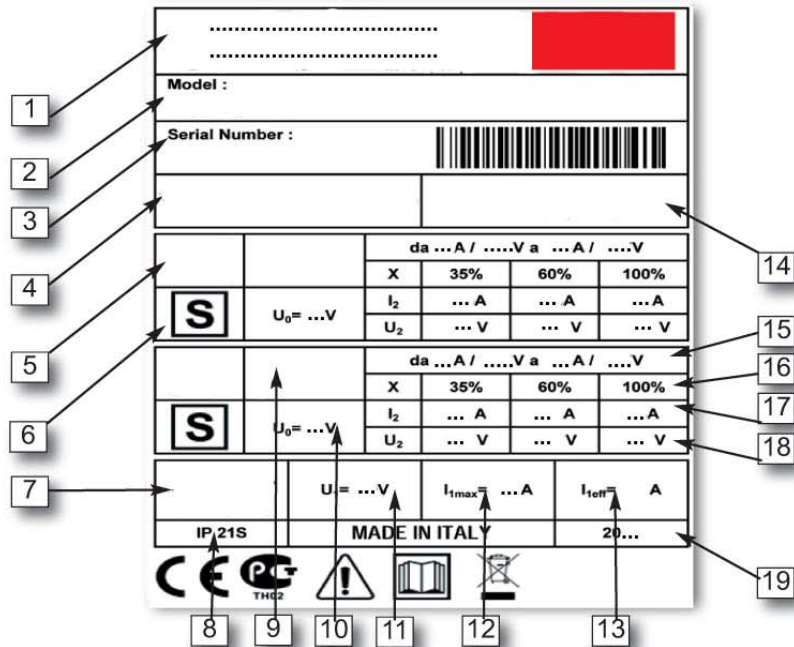
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# NOMINAL DATA

TARGA DATI, NOMINAL DATA, LEISTUNGSSCHILDER PLAQUE DONÉES, PLACA DE CARACTERÍSTICAS



1. NOME, INDIRIZZO E LOGO COSTRUTTORE 2. MODELLO 3. NUMERO DI SERIE 4. SCHEMA BLOCCHI 5. USCITA DI SALDATURA 6. UTILIZZABILE IN AMBIENTE A MAGGIOR RISCHIO DI SCOSSA ELETTRICA 7. ALIMENTAZIONE 8. GRADO DI PROTEZIONE 9. TIPO DI CORRENTE DI SALDATURA	10. TENSIONE NOMINALE A VUOTO 11. TENSIONE NOMINALE DI ALIMENTAZIONE 12. MASSIMA CORRENTE NOMINALE DI ALIMENTAZIONE 13. MASSIMA CORRENTE EFFETTIVA DI ALIMENTAZIONE 14. NORME DI PRODOTTO 15. RANGE CORRENTE TENSIONE DI SALDATURA 16. CICLO DI INTERMITTENZA 17. CORRENTE NOMINALE DI SALDATURA 18. TENSIONE CONVENZIONALE DI CARICO 19. ANNO DI FABBRICAZIONE	ITALIANO
1. MANUFACTURER'S NAME, ADDRESS AND COMPANY LOGO 2. MODEL 3. SERIAL NUMBER 4. BLOCK DIAGRAM 5. WELDING OUTPUT 6. SUITABLE FOR USE IN HIGH-VOLTAGE AREAS 7. POWER SUPPLY 8. DEGREE OF PROTECTION 9. TYPE OF WELDING OUTPUT CURRENT	10. INPUT VOLTAGE 11. RATED INPUT VOLTAGE 12. MAXIMUM RATED INPUT CURRENT 13. MAXIMUM EFFECTIVE INPUT CURRENT 14. APPLICABLE STANDARDS 15. RANGE OF WELDING VOLTAGE-CURRENT 16. DUTY CYCLE 17. RATED WELDING CURRENT 18. CONVENTIONAL LOAD VOLTAGE 19. YEAR OF CONSTRUCTION	ENGLISH
1. NAME, ADRESSE UND LOGO DES HERSTELLERS 2. MODELL 3. SERIENNUMMER 4. BLOCKSCHALTBIID 5. SCHWEISSAUSGANG 6. IN UMGEBUNG MIT HÖHERER STROMSCHLAGGEFAHR VERWENDBAR 7. SPEISUNG 8. SCHUTZART 9. SCHWEISSSTROMTYP	10. LEERLAUFNENNSPANNUNG 11. NENNNSPEISESPANNUNG 12. HÖCHSTER NENNNSPEISESTROM 13. HÖCHSTER EFFEKTIVER SPEISESTROM 14. PRODUKTNORMEN 15. SCHWEISSPANNUNGSSTROMBEREICH 16. AUSSETZBETRIEB 17. SCHWEISSNENNSTROM 18. KONVENTIONELLE LASTSPANNUNG 19. BAUJAHR	DEUTSCH
1. NOM, ADRESSE ET LOGO CONSTRUCTEUR 2. MODELE 3. NUMERO DE SERIE 4. SCHEMA FONCTIONNEL 5. SORTIE DE SOUDURE 6. UTILISABLE EN MILIEU A RISQUE D'ELECTRIFICATION ÉLEVÉE 7. ALIMENTATION 8. DEGRE DE PROTECTION 9. TYPE DE COURANT DE SOUDAGE	10. TENSION NOMINALE A VIDE 11. TENSION NOMINALE D'ALIMENTATION 12. COURANT NOMINAL D'ALIMENTATION MAXIMUM 13. COURANT EFFECTIF D'ALIMENTATION MAXIMUM 14. NORMES DE PRODUIT 15. PLAGE DE COURANT/TENSION DE SOUDAGE 16. CYCLE INTERMITTENT 17. COURANT NOMINAL DE SOUDAGE 18. TENSION CONVENTIONNELLE DE CHARGE 19. ANNÉE DE PRODUCTION	FRANÇAIS
1. NOMBRE, DIRECCIÓN Y LOGOTIPO DEL FABRICANTE 2. MODELO 3. NÚMERO DE SERIE 4. ESQUEMA BLOQUES 5. SALIDA DE SOLDADURA 6. SE PUEDE UTILIZAR EN AMBIENTES CON MAYOR RIESGO DE DESCARGAS ELÉCTRICAS 7. ALIMENTACIÓN 8. GRADO DE PROTECCIÓN 9. TIPO DE CORRIENTE DE SOLDADURA	10. TENSIÓN NOMINAL EN VACÍO 11. TENSIÓN NOMINAL DE ALIMENTACIÓN 12. MÁXIMA CORRIENTE NOMINAL DE ALIMENTACIÓN 13. MÁXIMA CORRIENTE EFECTIVA DE ALIMENTACIÓN 14. NORMAS DE PRODUCTO 15. ÁMBITO DE LA CORRIENTE DE TENSIÓN DE SOLDADURA 16. CICLO DE INTERMITENCIA 17. CORRIENTE NOMINAL DE SOLDADURA 18. TENSIÓN CONVENCIONAL DE CARGA 19. AÑO DE FABRICACIÓN	ESPAÑOL

# TECHNICAL SPECIFICATIONS

## **CONSTRUCTION DATA**

WEIGHT [Kg]:	23
Dimensions:	
Width [mm]:	270
Depth [mm]:	560
Height [mm]:	480
Degree of protection:	IP 21S
Height ASL [m]:	1000
Operating temp. [°C]:	-10/+40
Storage temp. [°C]:	-20/+55
Test temp. [°C]:	40
Applicable regulations:	EN.60974-1 EN.60974-10
Group/class:	Group 2 Class A
Thermal protection:	Built-in thermostat

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## **INPUT ELECTRICAL DATA:**

Line voltage:	230
No. of phases:	1
Frequency [Hz]:	50/60
Effective line current [A]:	21.6
Maximum line current [A]:	40.3
Input power [kVA]:	5
Power supply protections:	Delayed 25A fuses or Co K Curve 25A magneto-thermal switches

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## **OUTPUT DATA:**

Static Characteristics:	Drop
Wire diameter:	0.6-0.8-1.0-1.2
<b><u>First welding method:</u></b>	<b><u>MIG/MAG</u></b>
Welding range:	from 15A / 14.75V to 235A / 25.75V
No-load voltage [V]:	55
Output currents and voltages:	
Duty [%]:	35            60            100
I2 [A]:	220           160           130
U2 [V]:	25            22            20.5

---








<b><u>Second welding method:</u></b>	<b><u>TIG</u></b>
Welding range:	from 15A / 10.6V to 235A / 19.4V
No-load voltage [V]:	55
Output currents and voltages:	
Duty [%]:	35            60            100
I2 [A]:	220           160           130
U2 [V]:	18.8          16.4          15.2

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<b><u>Third welding method:</u></b>	<b><u>MMA</u></b>
Welding range:	from 15A / 10.6V to 185A / 17.4V
No-load voltage [V]:	55
Duty [%]:	35            60            100
I2 [A]:	185           138           109
U2 [V]:	27.4          25.52         24.36

# IMPORTANT INSTRUCTIONS



## WARNING SYMBOLS



	<b>DANGER</b> (Indicating a hazard that could cause injury or damage)
	<b>ELECTRIC SHOCK</b> (Indicating the danger of electric shock)
	<b>DANGER OF FIRE OR EXPLOSION.</b>
	Indicating that eye protection is required to avoid burns and eye damage.
	<b>TOXIC GAS</b> Indicating the risk of toxic gas hazards
	<b>HOT SLAG</b> Indicating the risk of being burned by hot slag
	<b>EYE PROTECTION</b> Indicating that eye protection is required to avoid flying debris
	<b>READ THE INSTRUCTION MANUAL</b>


## CAUTION



	<b>DANGER COMPRESSED GAS</b> Indicating the risk of injury or death in the event of improper handling or maintenance of compressed gas cylinders or regulators
	<b>FIRE PRECAUTIONS</b>
	<b>IMPORTANT INFORMATION</b> Indicating the precautions to be taken when installing and using the unit
	<b>DISPOSAL INFORMATION</b>
	<b>INSTALLATION INSTRUCTIONS</b>
	<b>OPERATING INSTRUCTIONS</b>
	<b>UNPACKING INSTRUCTIONS</b>
	<b>SUITABLE FOR USE IN HIGH-VOLTAGE AREAS</b>


## SAFETY WARNINGS


  This equipment is designed solely for industrial or professional use. As such, only experienced or fully-trained people should use the equipment. The user and/or owner is responsible for ensuring inexperienced personnel does not have access to the equipment.



  Fimer SpA declines all responsibility for injury or damage caused by inexperienced, improper or neglectful use of its equipment.



 A workman must look after his tools carefully! Remember that any tool or equipment can become a hazard if it is not looked after properly.  
Equipment in a state of disrepair or neglect can be dangerous. If it does not operate properly or overheats, the electricity supply should be removed immediately and the unit should be returned to the supplier for repair.



  Read this manual carefully before using your Welder. You can then do a better and safer job.  
By reading this manual you will learn more about the possibilities, limitations and potential dangers of welding. Retain this manual for the entire life of the equipment. It should be kept within the operator's reach at all times.



 The safety information contained in this manual is a guide to ensure you are not subjected to unnecessary risks. However, the operator must be competent and careful at all times.


 All equipment connected to electric power supplies can be dangerous if the manufacturers instructions are not read and observed. Read, understand and observe these safety instructions to reduce the risk of death or injury from electric shock. Ensure that even bystanders are aware of, and understand, the dangers that exist in the welding area.



  Fires and explosions can seriously injure or cause damage! Read, understand and observe all safety warnings to reduce the risk of death or injury from fire or explosion. Pay particular attention to the fact that even bystanders should be aware of, and understand, the dangers existing in the welding area. Remember that welding, by nature, produces sparks, hot spatter, molten metal drops, hot slag and hot metal parts that can cause fires, can burn skin and damage eyes.



  Arc rays can damage your eyes and burn your skin! Read, understand and observe all safety warnings to avoid damage from arc rays. Pay particular attention to the fact that even bystanders should be aware of, and understand, the dangers existing in the welding area. Wear a protective mask and make sure bystanders do the same.




  Fumes, toxic gases and vapours can be harmful! Read, understand and observe all safety warnings to avoid harm from toxic welding gases. Pay particular attention to the fact that even bystanders should be aware of, and understand, the dangers.

  Carelessness while using or maintaining the compressed gas cylinders or regulators can injure or kill the operator and/or bystanders! Read, understand and observe all safety warnings to avoid the dangers of compressed gas. Pay particular attention to the fact that even bystanders should be aware of, and understand, the dangers.

 **HIGH VOLTAGE**  
The unit carries potentially lethal voltage.  
The high voltage areas of the equipment have been segregated and can be reached only by using tools that are not provided with the Welder.  
All maintenance or repair operations requiring access to such areas may only be performed by Fimer-trained technicians.

  **FOREIGN OBJECTS**  
Never block the air vents with foreign objects and avoid any contact with liquids. Clean using just a dry cloth. These safety precautions apply even when the unit is switched off.

  **WEIGHT LOADS**  
The upper part of the Welder was not designed to withstand heavy loads. Never stand on the unit.

   **CABLE GAUGES**  
Check that all cables are appropriately gauged for the input power required by your specific Welder. This precaution applies also to extension cables, if used. All extension cables must be straight. Coiled cables can overheat, becoming dangerous. Twisted or coiled cables can also cause Welder malfunction.





#### OVERLOAD PROTECTION

Check that the power source supplying the Welder carries the correct voltage and is safety-protected. The power switch must open all the power supply circuits. (If a single-phase connection is used, both the live and the neutral poles must be open. If a three-wire connection is used, all three poles must be open. Four-wire circuits require all poles and neutral open). Time-delayed fuses or K-standard circuit breakers should be used.



#### EARTHING

If the Welder was not already supplied with a plug, connect the earth wire first. When removing the plug, disconnect the earth wire last.



#### PLUG AND POWER SUPPLY

If the Welder already has a plug attached, check that it is appropriate for the wall-socket you intend using. Never tamper with the power cable.



#### CABLE COLOURS

The green-yellow wire is for earthing. (Don't use it for anything else !)



#### RELOCATION 1

Some Welders are extremely heavy therefore care should be taken when relocating the unit. Check the floor or platform weight load limitations before relocating the unit if the Welder is to be used, even only temporarily, in a non-industrial environment



#### RELOCATION 2

Never store or move the Welder in an inclined position or on its side.



#### INSTALLATION ENVIRONMENT

The equipment is not suitable for use in washrooms, shower cubicles, pool areas or similar environments. If you are obliged to use the unit in such areas, turn off all water supplies and check the area has been evacuated.



#### OPERATING AND/OR INSTALLATION ENVIRONMENT 1

The Welder was not designed for installation or use in areas where it could be subject to blows or vibration, such as: road-vehicles, railway carriages, cable-cars, aircraft, ships or boats or similar environments (including cranes, conveyor-carriers or any other mobile equipment prone to vibration)



#### OPERATING AND/OR INSTALLATION ENVIRONMENT 2

The Welder should never be used or stored in the rain or in snow.



#### OPERATING AND/OR INSTALLATION ENVIRONMENT 3

Never use the Welder in an explosive, corrosive, abrasive or saline environment.



#### EXTINGUISHER

Always place an approved fire extinguisher in the immediate vicinity of the work area. Fire extinguishers should be checked regularly.



#### LOCATION

Place the Welder well away from heat sources. Place the Welder in a well-ventilated environment. Place the Welder in a safe, protected area. It must not be installed outdoors. Do not install the Welder in dusty environments. Dust can get into the inner parts of the unit and inhibit cooling. The Welder must be positioned on a flat, stable surface that extends further than the units own dimensions in all directions.



#### CLEAN LOCATIONS

The installation area must be kept clean and dry to be sure the Welder fans do not draw in small objects or liquids. Not only could the equipment malfunction but a serious risk of fire outbreak could be created.



#### REPAIRS

Never attempt to repair the Welder yourself. Always refer to the manufacturer or an authorized repairer. All warranty provisions will immediately become null and void if any repair, or attempt to repair, not specifically authorized in writing or handled by Fimer S.p.A. is carried out. Furthermore, Fimer S.p.A. will accept no responsibility for any malfunction or damage resulting as a consequence of such unauthorized action.



#### TECHNICAL ASSISTANCE

The Welder must be taken to an authorized Technical Assistance Centre if the equipment has been damaged in any way or if any one of the following events occurs: liquid infiltration; damage caused by falling objects; exposure to rain or humidity (exceeding the specified limits); malfunction; performance failure or if the equipment has been dropped.



#### SPARE PARTS

Use only manufacturer-recommended spare parts. Other spare parts could cause equipment malfunction. The use of non-original spare parts will also result in the warranty provisions becoming null and void, releasing the manufacturer from any responsibility for malfunction or damage resulting as a consequence of such action.

### WELDING OPERATION SAFETY INSTRUCTIONS



#### CAUTION !

Welding processes can be dangerous for the operator and bystanders if the safety warnings and instructions are not heeded.

#### PERSONNEL PROTECTION

Together with the previous instructions, the following precautions should be strictly observed



#### PROTECTION MASK

Wear a protective non-flammable welding mask to protect your neck, your face and the sides of your head. Keep the front lens clean and replace it if it is broken or cracked. Place a transparent protection glass between the mask and the welding area.



#### CLOTHING

Wear close-fitting, closed, non-flammable, pocketless clothing.



#### VENTILATION

Weld in a well-ventilated environment that does not have direct access to other work areas.



#### EYE PROTECTION

NEVER look at the arc without appropriate eye protection.



#### FUMES AND GASES 1

Clean away paint, rust or any other dirt from the item to be welded to avoid the creation of dangerous fumes.



#### FUMES AND GASES 2

NEVER weld on metals containing zinc, mercury, chromium, graphite, heavy metals, cadmium or beryllium unless the operator and the bystanders use appropriate air-supplied respirators.

#### HIGH VOLTAGE PROTECTION

Together with the previous instructions, the following precautions should be strictly observed



#### CONFINED SPACES

When welding in small environments, leave the power source outside the area where welding will take place and attach the grounding clamp to the part to be welded.



#### HUMIDITY

Never weld in wet or humid environments.



#### DAMAGED CABLES

Never use damaged cables. (This applies to both the power and the welding cables.)



#### DAMAGED CABLES

Never remove the unit side panels. If the side panels can be opened, always checked they are closed tightly before starting any work.

#### FIRE PREVENTION

Together with the previous instructions, the following precautions should be strictly observed. Welding operations require high temperatures therefore the risk of fire is great.



#### WORK-AREA FLOORING

The work-area flooring MUST be fireproof.



#### WORK-AREA SURFACES

Work benches or tables used during welding MUST have fireproof surfaces.





#### WALL AND FLOOR PROTECTION

The walls and flooring surrounding the welding environment must be shielded using non-flammable materials. This not only reduces the risk of fire but also avoids damage to the walls and floors during welding processes.



#### EXTINGUISHER

Place an approved and appropriately-sized fire extinguisher in the work environment. Check its working order regularly (carry out scheduled inspections) and ensure that all parties involved know how to use one.



#### CLEAN ENVIRONMENT

Remove all flammable materials away from the work environment.



#### SERIOUS DANGER ! 1

NEVER weld in confined spaces (e.g. in a container vehicle, a cistern or a storeroom etc.) where toxic, inflammable or explosive materials are, or have been, located or stored. Cisterns, in particular, may still contain toxic, flammable or explosive gases and vapours years after they have been emptied.



#### SERIOUS DANGER ! 2

NEVER weld a cistern that contains (or has stored) toxic, inflammable or explosive materials. They could still contain toxic, flammable or explosive gases and vapours years after they have been emptied. If you are obliged to weld a cistern, ALWAYS passivate it by filling it with sand or a similar inert substance before starting any work.



#### SERIOUS DANGER! 3

NEVER use the Welder to melt frozen water pipes.

### VENTILATION

Together with the previous instructions, the following precautions should be strictly observed



#### WELDING ENVIRONMENT VENTILATION

Ventilate the welding environment carefully. Maintain sufficient air-flow to avoid toxic or explosive gas accumulation. Welding processes on certain kinds or combinations of metals can generate toxic fumes. In the event of this happening, use air-supply respirators. BEFORE welding, read and understand the welding alloy safety provisions.

### PROTECTIVE WELDING GASES

Together with the previous instructions, the following precautions should be strictly observed when welding with protective gases



#### GAS TYPES

These welders use only inert (non-flammable) gases for welding arc protection. It is important that the appropriate type of gas is chosen for the type of welding being performed.



#### UNIDENTIFIED GAS CYLINDERS

NEVER use unidentified gas cylinders.



#### PRESSURE REGULATOR 1

NEVER connect the cylinder directly to the Welder. Always use a pressure regulator.



#### PRESSURE REGULATOR 2

Check the regulator is performing its function properly. Read the regulator instructions carefully.



#### PRESSURE REGULATOR 3

Never lubricate any part of the regulator.



#### PRESSURE REGULATOR 4

All regulators are designed for a specific type of gas. Check the regulator is appropriate for the protective gas to be used.



#### DAMAGED GAS CYLINDERS

NEVER use damaged or faulty cylinders.



#### CYLINDER RELOCATION

NEVER lift a gas cylinder by holding the regulator.



#### GAS CYLINDERS

Do not expose gas cylinders to excessive heat sources, sparks, hot slag or flames.



#### GAS HOSE 1

Check the gas hose is not damaged.



#### GAS HOSE 2

Always keep the gas hose well away from the work area.

### ELECTRIC SHOCK

Together with the previous instructions, the following precautions should be strictly observed to reduce the risk of electric shock



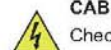
#### ELECTRIC SHOCK INJURY

DO NOT touch a person suffering from electric shock if he/she is still in contact with the cables. Switch the mains power source off immediately THEN provide assistance.



#### CABLE CONTACT

Do not tamper with power cables if the mains power is still switched on. Do not touch the welding circuitry. Welding circuitry is usually low voltage, however, as a precaution, do not touch the welder electrodes.



#### CABLE AND PLUG PRECAUTIONS

Check the power supply cable, plug and wall-socket regularly. This is particularly important if the equipment is relocated often.



#### REPAIRS

Never attempt to repair the Welder yourself. The result would not only cause warranty cancellation but also high danger risks.



#### MAINTENANCE PRECAUTIONS

Always check that the electric power supply has been disconnected before performing any of the maintenance operations listed in this manual ( e.g. before replacing any of the following: worn electrodes, welding wires, the wire feeder etc.)



Never point the welding gun or the electrode towards yourself or others.

### ELECTROMAGNETIC COMPATIBILITY



Check no power supply cables, telephone cables or other electrical items (e.g. computer cables, control lines etc.) are in the vicinity of the Welder.



Check there are no telephones, televisions, computers or other transmission devices close to the Welder.



Make sure that people with pace-makers are not in the immediate vicinity of the Welder.



Do not use the Welder in hospitals or medical environments (including veterinary surgeries). Make especially sure there is no electrical medical equipment being used close to where welding is being done.



Should the Welder interfere with other apparatus, take the following precautionary measures:

1. Check the Welder's side panels are securely fastened.
  2. Shorten the power supply cables.
- Place EMC filters between the Welder and the power source. (Contact Fimer Technical Dept. in this respect )



EMC compatibility : CISPR 11, Group 2, Class A.

# 1. GENERAL FEATURES AND NOTES ON CONSULTING THE MANUAL

The TM236 welding machines use INVERTER technology. They are extremely compact and versatile machines that can be used in all situations where high performances must be achieved in a limited amount of space.

These welders are for Synergic MIG/MAG (Short-Arc and Pulsed), conventional MIG/MAG (Short-Arc and Pulsed), TIG and MMA (Synergic and conventional) welding.

The innovative interface system allows a simple and intuitive use of the machine with the possibility to personalise nearly every welding parameter.

All the main parameters of the machine are stored on a special memory card (SD-Card); in this way, your machine will always be up-to-date with the most recent developments in the welding field (e.g. synergic curves for new materials, etc.).

The removal of the memory card prevents the machine from operating, which therefore makes it an effective antitheft system and protection device against improper use.

The wire spool of 300 mm necessary for MIG welding is lodged internally.

The advanced control techniques adopted allow reaching quality results that until today were only reserved to much larger and more expensive machines, while maintaining a very high level of reliability and ease of use.

**This machine allows executing the following types of welding:**

**MIG Welding: short-arc, manual**

**MIG Welding: pulsed, manual**

**MIG Welding: short-arc, synergic**

**MIG Welding: pulsed, synergic**

**TIG Welding: Lift-Arc**

**TIG Welding: Lift-arc, pulsed**

**MMA Welding: Manual**

**MMA Welding: Synergic**

A traditional and push-pull or spool torch can also be used for MIG welding.

This user manual contains in-depth information on the adjustments and operating modes of the machine: its complete reading will allow you to appreciate its extreme flexibility and practicality of use.

Please note that the figures most frequently referred to (figures 1 to 4) are grouped together on page 12.

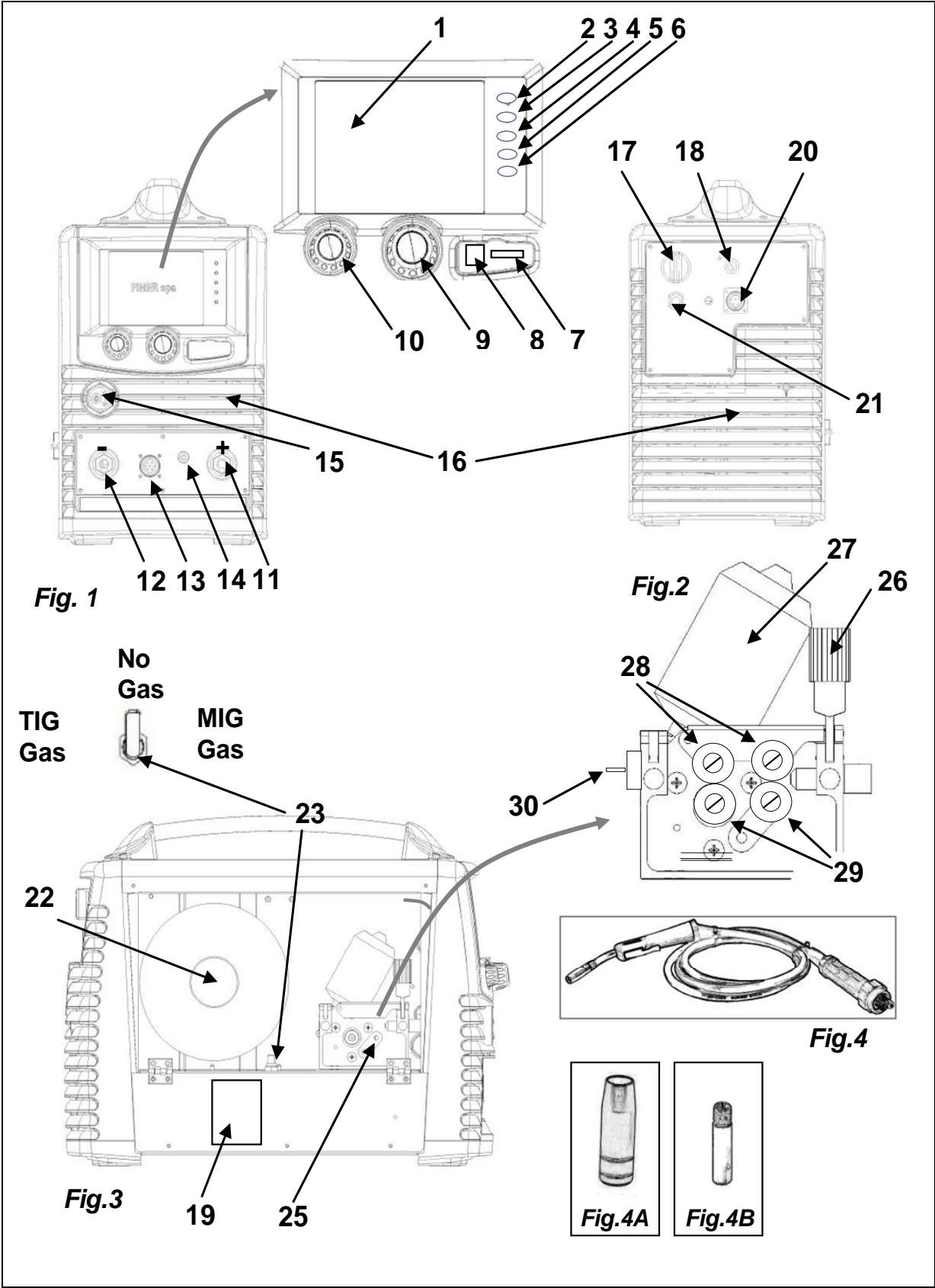
If you do not consider it necessary to read the manual completely, depending on the type of welding to be executed, we recommend reading at least the following sections (as well as the warnings on page 6 of this manual):

<b>MIG Welding: short-arc, manual</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.1. MIG/MAG welding 3.1.1. Manual short-arc MIG welding 4. Power supply connection 5. Output connections 5.1 Connection for MIG welding with traditional torch and gas 5.2 Connection for MIG welding with Spool or Push-pull torch and gas 6. Installation of the welding wire 7. Connection of the gas cylinder and regulator 8. Welding process 8.1 Manual MIG welding	<b>TIG Welding</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.2 TIG Welding 3.2.1 Traditional TIG welding 4. Power supply connection 5. Output connections 5.3 Connection for TIG welding 7. Connection of the gas cylinder and regulator 8. Welding process 8.4 TIG Welding
<b>MIG Welding: pulsed, manual</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.1 MIG/MAG welding 3.1.3 Manual pulsed MIG welding 4. Power supply connection 5. Output connections 5.1 Connection for MIG welding with traditional torch and gas 5.2 Connection for MIG welding with Spool or Push-pull torch and gas 6. Installation of the welding wire 7. Connection of the gas cylinder and regulator 8. Welding process 8.1 Manual MIG welding	<b>Pulsed TIG welding</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.2 TIG Welding 3.2.2 Pulsed TIG welding 4. Power supply connection 5. Output connections 5.3 Connection for TIG welding 7. Connection of the gas cylinder and regulator 8. Welding process 8.4 Pulsed TIG welding
<b>MIG Welding: short-arc, synergic</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.1. MIG/MAG welding 3.1.2 Synergic short-arc MIG welding 4. Power supply connection 5. Output connections 5.1 Connection for MIG welding with traditional torch and gas 5.2 Connection for MIG welding with Spool or Push-pull torch and gas 6. Installation of the welding wire 7. Connection of the gas cylinder and regulator 8. Welding process 8.2 Synergic MIG welding with gas	<b>Manual MMA welding</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.3 MMA Welding 3.3.1 Manual MMA welding 4. Power supply connection 5. Output connections 5.4 Connection for MMA welding 8. Welding process 8.3 Manual MMA welding
<b>MIG Welding: pulsed, synergic</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3.1. MIG/MAG welding 3.1.4 Synergic, pulsed MIG welding 4. Power supply connection 5. Output connections 5.1 Connection for MIG welding with traditional torch and gas 5.2 Connection for MIG welding with Spool or Push-pull torch and gas 6. Installation of the welding wire 7. Connection of the gas cylinder and regulator 8. Welding process 8.2 Synergic MIG welding with gas	<b>Synergic MMA welding</b> 1. General features 2. Description of the machine 3. Description of the various types of welding 3. MMA Welding 3.3.2 Synergic MMA welding 4. Power supply connection 5. Output connections 5.4 Connection for MMA welding 8. Welding process 8.3. Synergic MMA welding

Attention: The machine can only be used for the purposes described in this manual and must not be used to thaw pipes.



2. DESCRIPTION OF THE MACHINE

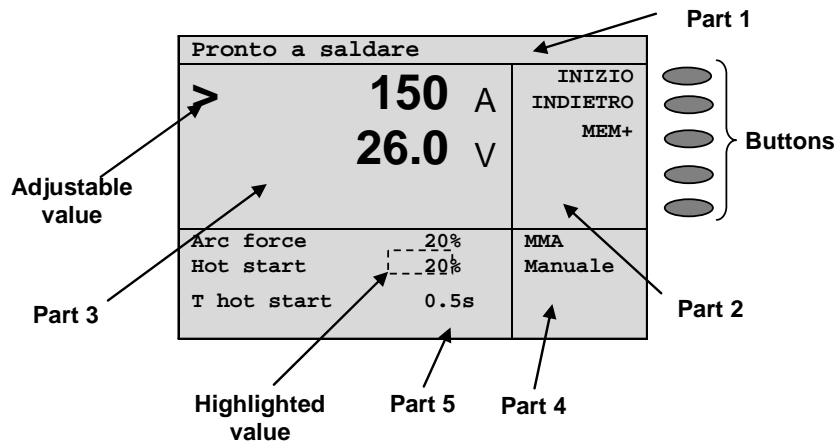


**FIGURE 1:**

**1. Graphic display:**

The display shows different screens depending on whether the machine is in welding mode or setting mode.

In welding mode, the display is divided into five main parts:



*Part 1:* State of the machine

*Part 2:* Meaning of the active buttons (buttons 2, 3, 4, 5 of fig. 1)

*Part 3:* Value of the measurements set

*Part 4:* Type of welding

*Part 5:* Indicates the values set for the various welding parameters (to change the set value, highlight the value with knob 10 and press to confirm; the value is highlighted as a negative. Change the value by turning the knob and confirm the new value by pressing knob 10 again).

*Adjustable value:* Indicates the welding parameter that can be changed with knob 9.

*Highlighted value:* Indicates the welding parameter that is being changed with knob 10.

During the setting mode, the display shows different screens according to the value being set at that moment (see the following sections relating to the various welding methods).

**The display also shows:**

- At start-up, the Fimer logo and the Firmware revision are displayed.

2. **Command button:** Its meaning is reported in the first line of Part 2 of the display; normally, the pressing of this button returns to the main screen.
3. **Command button:** Its meaning is reported in the second line of Part 2 of the display; normally, the pressing of this button returns to the previous screen.
4. **Command button:** Its meaning is reported in the third line of Part 2 of the display; when this button is pressed, it memorises the current machine settings (up to a maximum of 32).
5. **Command button:** Its meaning is reported in the fourth line of Part 2 of the display; this button allows the gas to flow without the need to press the torch button.
6. **Wire feed button:** When active, the wire (MIG) can be advanced.
7. **SD slot:** This slot, covered by a special plastic cover, must contain the SD-Card supplied with the machine; without this card, the machine remains inactive and a special signal is reported on the display.
8. **USB port:** only for technical assistance.
9. **Knob for setting the main welding parameter:** the main welding parameter can be set with this knob:
  - MMA Welding:** sets the welding current.
  - TIG Welding:** sets the welding current.
  - Manual MIG welding:** sets the welding voltage.
  - Synergic MIG welding:** sets the thickness of the piece to be welded.

10. **Knob for setting the other welding parameters:** The remaining welding parameters can be set with this knob; turn the knob to select the parameter and press to confirm, turn the knob again to change the set value and press again to confirm the new value.
11. **“+” front inlet:**  
MMA Mode: Electrode holder  
TIG Mode: Ground clamp  
MIG Mode with gas: Not used  
MIG Mode without gas: Ground clamp
12. **“-” front inlet:**  
MMA Mode: Ground clamp  
TIG Mode: TIG torch  
MIG Mode with gas: Ground clamp  
MIG Mode without gas: Not used
13. **Remote connector:** This connector allows using the following types of torches:  
MIG torch (GAN Spool)  
MIG torch (Push-Pull)  
TIG torch
14. **GAS outlet:**  
MMA Mode: inactive (internal tap positioned on NO GAS)  
MIG Mode with gas: inactive (internal tap positioned on MIG GAS)  
MIG Mode without gas: inactive (internal tap positioned on NO GAS)  
TIG Mode: Gas connection to the welding torch (Internal tap positioned on TIG GAS)
15. **Euroconnector: quick connector for welding torch.** This connector is used to supply welding gas to the torch, the electrical contacts of the torch button and the welding current.
16. **Air grills**

#### FIGURE 2:

16. **Air grills**
17. **ON-OFF switch:** turns the machine on and off.
18. **Input cable:** connection cable to the mains power equipped with plug.
20. **Connector for supplying power to the liquid cooling system (Optional):** Warning: the connector contains dangerous voltages: NEVER use it for purposes other than those for which it was specifically designed.
21. **Welding gas inlet**  
MMA Mode: Not used  
TIG Mode: GAS connection to the cylinder  
MIG Mode with gas: GAS connection to the cylinder  
MIG Mode without gas: Not used

#### FIGURE 3:

19. **Nominal data**
22. **Wire spool**
23. **Gas tap:** The gas tap has three positions  
MIG GAS Position: sends welding gas coming from connection 21 of the cylinder to the Euroconnector (use this position for MIG welding with gas)  
NO GAS Position: interrupts the gas flow (use this position for MMA welding and MIG welding without gas)  
TIG GAS Position: sends welding gas coming from connection 21 of the cylinder to inlet 14 location on the front (use this position for TIG welding)
25. **Wire Feeder**
26. **Wire pressure regulators:** allow regulating the tension of the welding wire.
27. **Wire-feeder motor**
28. **Upper wire feed rollers**
29. **Lower wire feed rollers**
30. **Wire inlet of the wire feeder motor**



### 3. DESCRIPTION OF THE VARIOUS TYPES OF WELDING

This chapter briefly describes the various welding methods and the main settings that need to be set in order to execute them. The reading of this chapter is not sufficient for knowing how to use the machine correctly. Therefore, it is also important to read the following sections (especially, the chapters regarding the methods for connecting the torches and ground cables).

N	WELDING PROCESS	Euroconnector 15 of fig 1	Front inlet + 11 of fig 1	Front inlet - 12 of fig. 1
1	MMA	NOT USED	ELECTRODE HOLDER	GROUND CABLE
2	TIG	NOT USED	GROUND CABLE	TORCH CABLE
3	MIG	TORCH CABLE	NOT USED	GROUND CABLE

#### 3.1 MIG/MAG WELDING

To select this welding method go to the selection menu (if necessary, press button 2: start).  
Select MIG-MAG with knob 10 and press to confirm.

Ready to weld	
MMA MIG-MAG TIG	START BACK
	OPTIONS

#### MIG/MAG welding:

In MIG/MAG (Metal Inert Gas and Metal Active Gas) welding, a metal electrode consisting of a wire is melted in a weld pool. The wire electrode is continuously fed by a welding torch at a constant and controlled speed. As the wire is fed, it touches the piece to weld and an electric arc is produced. The arc melts the wire which is then deposited on the workpiece.

Welding with continuous feeding of the wire allows using a higher current density than that used in welding with coated electrodes. This allows increasing weld penetration and reducing the number of passes required to fill the join.

This welding machine can use the following types of wire:

- 1. Solid wire:** must always be used with protective gas – connection of line 3, Fig. 5.
- 2. Flux-cored wire for welding with gas:** its central part contains a mineral product for improving the welding characteristics (must always be used with gas) – connection of line 3 of Fig. 5.

For an excellent welding performance, it is recommended to use welding spray. This will increase the sealing capacity and reduce weld spatter.

There are four main MIG-MAG welding methods:

- 1 Manual short-arc
- 2 Synergic Short-Arc
- 3 Pulsed, manual
- 4 Pulsed, Synergic

Turn knob 10 to select one of the different MIG-MAG welding methods; press to confirm the selection.

Select MIG-MAG procedure	
Short arc ma Short arc si Arc puls. m Arc puls. s Mig-mag-01 Mig-mag-02 ▼	START BACK
	OPTIONS
	MIG-MAG

The MIG-MAG-01, MIG-MAG-02 etc.... welding methods can be saved by the user; up to 32 different settings can be saved using button 4 of fig. 1.

3.1.1 MANUAL SHORT-ARC MIG WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MIG-MAG procedure	
Short arc ma Short arc si Arc puls. m Arc puls. s Mig-mag-01 Mig-mag-02 ▼	START BACK
	OPTIONS

Once the selection has been made, this screen is displayed:

Ready to weld	
> 96 A 15.5 v 2.3 m/ '	START BACK MEM+
Inductance 5.0 2/4 strokes 2t	MIG-MAG S.A.M.
P1/2	

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

pre gas t	0.0s
post gas t	0.5s
downslope t	0.5s
burn back t	25ms
Timer	5.0s
Water pump	ON
P2/2	

During manual welding, the welding current (whose value is always shown on the display) can be regulated via knob 9 shown in fig. 1; the display also shows the relative arc voltage and wire speed.

To regulate the wire speed, turn knob 10 to select the “wire speed” parameter, press the knob to confirm the value selected, turn the knob again to set the desired speed and press again to confirm.

The welding current and wire speed must be regulated according to the thickness of the piece to be welded. Larger pieces require a higher welding current and a faster wire speed. The wire speed must be adjusted during welding to obtain the best result.

The quality of the welding can be improved even further by regulating the “Inductance” parameter according to the instructions reported in section 8.1 (the electronic inductance can be regulated by following the same procedure as that for setting the wire speed).

The 2/4 stroke parameter allows setting the operation in 2-stroke or 4-stroke mode.

**2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.

**4t:** In the “4-stroke” operating mode, the welding process starts with the first pressing of the torch button and stops when this button is pressed for a second time.

The “Crater Filler” function is active in this mode. When the torch button is pressed for the second time (at the end of welding), the current decreases from the set value until it reaches zero in a time set between zero and ten seconds by the “current downslope t”.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

- pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.
- post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.
- current downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching zero (only in 4-stroke mode).
- burn back t:** setting of the burn-back time.
- Timer:** timer setting: the timer sets the maximum time for continuous welding (i.e. limits the time spent welding with the torch button pressed).
- Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.



### 3.1.2. SYNERGIC SHORT ARC MIG WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MIG-MAG procedure	
Short arc ma	START BACK
Short arc si	
Arc puls. m	OPTIONS
Arc puls. s	MIG-MAG
Mig-mag-01	
▼ Mig-mag-02	

Once the selection has been made, the display shows the page for selecting the welding wire material.

Select the type of wire	
Fe	START BACK
SS	
AlMg	
AlSi	OPTIONS
CuAl	MIG-MAG
CuSi3	S.A.S
InoxA	
Fe A	

(The parameters that do not appear on the screen can be accessed by turning knob 10.)

Once the type of wire has been selected (by pressing knob 10), the page for setting the diameter of the welding wire opens.

Select wire diameter	
0.6mm	START BACK
0.8mm	
1.0mm	
1.2mm	OPTIONS
1.6mm	MIG-MAG
	S.A.S
	SS

Once selected, this screen is displayed:

Ready to weld		
47 A		START
16.3 v		BACK
> 1.1 mm		MEM+
Arc length	-20%	MIG-MAG
2/4 strokes	2t	S.A.M.
Wire speed	3.0m/'	Fe
Inductance	5.0	0.6mm
P1/2		

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

pre gas t	0.0s
post gas t	0.5s
downslope t	0.5s
burn back t	25ms
Timer	5.0s
Water pump	ON
P2/2	

Synergic MIG welding allows easily adapting the welding parameters to the different materials to be welded.

During welding with synergic regulation, knob 9 shown in fig. 1 allows adjusting the wire thickness (i.e. the welding power).

The wire speed is automatically adjusted to the set power in relation to the type and diameter of the wire selected.

The percentage of the arc length can be changed via the “arc length” parameter.

The welding quality can be improved even further by regulating the “Electronic Inductance” parameter (to regulate the electronic inductance follow the same procedure as that for setting the wire speed).

The 2/4 stroke parameter allows setting the operation in 2-stroke or 4-stroke mode.

**2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.

**4t:** In the “4-stroke” operating mode, the first pressing of the torch button starts the welding process, and a second pressing stops the welding process.

The “Crater Filler” function is active in this mode: when the torch button is pressed for the second time (at the end of welding), the current decreases from the set value until it reaches zero in a time set between zero and ten seconds by the “current downslope t”.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

**pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.

**post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.

**current downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching zero (only in 4-stroke mode).

**burn back t:** setting of the burn-back time.

**Timer:** timer setting: the timer sets the maximum time for continuous welding (i.e. limits the time spent welding with the torch button pressed).

**Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.

### 3.1.3 MANUAL PULSED MIG WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MIG-MAG procedure	
Short arc ma	START
Short arc si	BACK
Arc puls. m	OPTIONS
Arc puls. s	MIG-MAG
Mig-mag-01	
▼ Mig-mag-02	

Once selected, this screen is displayed:

Ready to weld	
> 97 A	START
15.1 v	BACK
	MEM+
Wire speed 3.0m/'	MIG-MAG
back ground I 30A	A.P.M.
burn back I 300A	
burn back t 20ms	
2/4 strokes 2t	
P1/2	

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

pre gas t 0.0s
post gas t 0.5s
downslope t 0.5s
burn back t 25ms
Timer 5.0s
Water pump ON
Arc length +20%
P2/2

During welding with manual regulation, potentiometer 11 shown in fig. 1 regulates the arc voltage (whose value appears on the display); the display also shows the relative welding current.

To regulate the wire speed, turn knob 10 to select the “wire speed” parameter, press the knob to confirm the value selected, turn the knob again to set the desired speed and press to confirm.

The other parameters shown in the figure can also be regulated via knob 10.

**back-ground I:** setting of the base current; i.e. the current that is maintained continually for the entire duration of the welding and that is increased during the pulse peak.

**I peak:** setting of the peak current, i.e. the value that the welding current is increased during the pulse peak.

**burn-back I:** setting of the burn-back current.

**burn back t:** setting of the burn-back time (expressed as a percentage).  
continuous (i.e. limits the time that can be welded with the torch button pressed).

**2/4 strokes:** setting of the 2-stroke or 4-stroke operating mode.

**2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.

**4t:** In the “4-stroke” operating mode, the first pressing of the torch button starts the welding process, and a second pressing stops the welding process. The “Crater Filler” function is active in this mode. when the torch button is pressed for the second time (at the end of welding), the current decreases from the set value until it reaches zero in a time set between zero and ten seconds by the “current downslope t”.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

- pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.
- post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.
- current downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching zero (only in 4-stroke mode).
- Timer:** timer setting: the timer sets the maximum welding time
- Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.
- Arc length:** setting this parameter (variable from -100% up to +100%) allows shortening (negative values) or lengthening (positive values) the welding arc.

### 3.1.4 SYNERGIC PULSED MIG WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MIG-MAG procedure	
Short arc ma	START
Short arc si	BACK
Arc puls. m	OPTIONS
Arc puls. s	
Mig-mag-01	
Mig-mag-02	

Once the selection has been made, the display shows the page for selecting the welding wire material.

Select the type of wire	
Fe	START
SS	BACK
AlMg	OPTIONS
AlSi	
CuAl	MIG-MAG S.A.S
Cusi3	
InoxA	
Fe A	

(The parameters that do not appear on the screen can be accessed by turning knob 10)  
Once the type of wire has been selected (by pressing knob 10), the page for setting the diameter of the welding wire opens.

Select wire diameter	
0.6mm	START BACK
0.8mm	
1.0mm	OPTIONS
1.2mm	
1.6mm	
	MIG-MAG S.A.S SS

Once the type of wire has been selected, this screen is displayed:

Ready to weld	
47 A 16.3 v > 1.1 mm	START BACK MEM+
Wire Speed Arc 10% Length -20% 2/4 strokes 2t Wire speed 3.0m/'	MIG-MAG S.A.M. SS 0.8mm
P1/2	

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

back-ground I	0%
pre gas t	0.0s
post gas t	0.5s
downslope t	0.5s
burn back t	25ms
Wire speed	10%
timer	5.0s
Water pump	ON
P2/2	

Synergic Pulsed MIG welding allows obtaining a very “clean” welding (i.e. without any spattering of the melted materials).

Pulsed welding is particularly suitable for welding materials such as stainless steel (Ni-Cr), aluminium (Al) and copper silicone (Cu-Si3), but is not suitable for ferrous materials (SG2, SG3)

During welding with synergic regulation, knob 9 shown in fig. 1 allows adjusting the wire thickness (i.e. the welding power).

The wire speed is automatically adjusted to the set power depending on the type and diameter of the wire selected.

The wire speed can be changed slightly via the “wire speed” parameter.

The other parameters shown in the figure can also be regulated via knob 10:

**Arc length:** setting this parameter (variable from -10 up to +9) allows shortening (negative values) or lengthening (positive values) the welding arc.

**2/4 strokes:** setting of the 2-stroke or 4-stroke operating mode.

**2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.



**4t:** In the “4-stroke” operating mode, the first pressing of the torch button starts the welding process, and a second pressing stops the welding process. The “Crater Filler” function is active in this mode: when the torch button is pressed for the second time (at the end of welding), the current decreases from the set value until it reaches zero in a time set between zero and ten seconds by the “current downslope t”.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

- back-ground I:** setting of the base current i.e. the current that is maintained continually for the entire duration of the welding process and which is increased during the pulse peak (a variation of  $\pm 20\%$  can be made in relation to the value automatically set).
- pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.
- post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.
- current downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching zero (only in 4-stroke mode).
- burn back t:** setting of the burn-back time (expressed as a percentage).
- Timer:** timer setting: the timer sets the maximum time for continuous welding (i.e. limits the time spent welding with the torch button pressed).
- Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.

### 3.2 TIG WELDING

To select this welding method, go to the selection menu (if necessary, press button 2: start).

Select TIG using knob 10 and press to confirm.

Ready to weld	
MMA MIG-MAG TIG	START BACK
	OPTIONS

Arc welding with inert gas (Argon) and infusible tungsten electrode (often shortened to TIG welding: Tungsten Inert Gas) is a welding procedure where the heat is produced by an arc that strikes against a non-consumable electrode and the piece to be welded. The welding is executed by melting the edges of the workpiece and inserting other materials coming from filler irons, thus creating the join.

The arc is established by touching the workpiece with the electrode.

The TIG procedure is suitable for any type of working position and can be applied on very thin metal sheets. TIG welding is characterised by its high level of arc control, powerful and concentrated heat source and greater control of the quality of the filling material. This makes the TIG procedure particularly suitable for precision welding on a wide range of thicknesses, for welding in difficult positions and on pipes that require high welding penetration.

This procedure allows using a variety of different materials such as iron, nickel alloy, copper, titanium, magnesium, etc. However, this type of welding is not suitable for aluminium.

During welding, the potentiometer (11 in figure 1) regulates the welding current.

The correct connection of the torch and ground cable is shown in line 2 of figure 5.

The machine does not include the TIG torch necessary for welding; this can be purchased separately.

### 3.2.1 TRADITIONAL TIG WELDING

To access this operating method, turn knob 10 to make the selection shown in the figure.

Select TIG procedure	
Lift arc	START
Lift arc pul	BACK
	OPTIONS
	TIG

Once selected, this screen is displayed:

Ready to weld	
> 150 A 16.0 v	START BACK MEM+
2/4 strokes 2t pre gas t 3s post gas t 2s	TIG Lift Arc
P1/2	

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

initial I	30A
final t	20A
downslope t	0.5s
Water pump	ON
P2/2	

During welding, knob 9 shown in figure 1 allows regulating the welding current (whose value is continually displayed on the display); the display also shows the relative arc voltage.

The other parameters shown in the figure can also be regulated via knob 10:

- 2/4 strokes:** setting of the 2-stroke or 4-stroke operating mode.  
**2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.  
**4t:** In the “4-stroke” operating mode, the first pressing of the torch button starts the welding process, and a second pressing of this button stops the welding process.
- pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.
- post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

- Initial I:** setting of the initial value of the current when the torch button (only active in 4-stroke mode).
- final I:** setting of the final value of the current after the current\_downslope\_t of the torch button (only active in 4-stroke mode).

- downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching the “final I” value (only in 4-stroke mode).
- Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.

### 3.2.2 PULSED TIG WELDING

To access this operating method, turn knob 10 to make the selection shown in the figure.

Select TIG procedure	
Lift arc	START BACK
Lift arc pul	
	OPTIONS
	TIG

Once the selection has been made, the following welding screen opens:

Ready to weld		
> 150 A 16.0 v		START BACK MEM+
2/4 strokes	2t	TIG
pre gas t	3s	Lift Arc
post gas t	2s	
P1/2		

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

back ground I	80A
initial I	30A
final I	20A
current downslope t:	0.5s
total period t	12ms
pulse period t	5ms
Water pump	ON
Timer	5.0s
P2/2	

During welding, knob 9 shown in figure 1 regulates the welding current (whose value appears on the display); the display also shows the relative arc voltage.

The other parameters shown in the figure can also be regulated via knob 10:

- 2/4 strokes:** setting of the 2-stroke or 4-stroke operating mode.
- 2t:** In the “2-stroke” operating mode, the torch button welds for the entire time it is pressed.
- 4t:** In the “4-stroke” operating mode, the first pressing of the torch button starts the welding process, and a second pressing of this button stops the welding process.

**pre gas t:** setting of the time in which, upon the pressing of the torch button, the gas flows without the arc being established.

**post gas t:** setting of the time in which, upon release of the torch button, the gas continues to flow after the arc has been turned off.

Menu 2/2 can be accessed by pressing knob 10 for 3 seconds and turning it:

**back-ground I:** setting of the base current i.e. the current that is maintained continually for the entire duration of the welding process and that is increased during the pulse peak.

**Initial I:** setting of the initial value of the current when the torch button (only active in 4-stroke mode).

**final I:** setting of the final value of the current after the current\_downslope\_t of the torch button (only active in 4-stroke mode).

**current downslope t:** setting of the time in which, upon release of the torch button, the current decreases by the set value until reaching the “final I” value (only in 4-stroke mode).

**current upslope t:** setting of the time in which, upon pressing of the torch button, the current increases by the “initial I” value until it reaches the set value (only in 4-stroke mode).

**total period t:** setting of the pulse period.

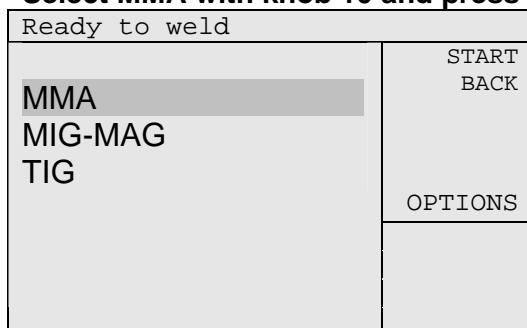
**pulse period t:** setting of the duration of the pulse.

**Water pump:** if ON, the water pump is enabled, if OFF, the cooling water pump is disabled.

**Timer:** timer setting: the timer sets the maximum time for continuous welding (i.e. limits the time spent welding with the torch button pressed).

### 3.3 MMA WELDING

To select this welding method go to the selection menu (if necessary, press button 2: start).  
Select MMA with knob 10 and press to confirm.



Arc welding with MMA (Metal Manual Arc) coated electrode or SMAW (Shielded Metal Arc Welding) is a manual welding procedure that makes use of the heat generated by an electric arc that strikes against a coated fusible electrode and the piece to be welded. This procedure is commonly used in welding because of its versatility. In fact, it allows making joints in any position: in the machine shop, outdoors, in confined areas or hard to access areas. A vast range of electrodes is also available on the market for meeting the most varied requirements. The striking of the arc occurs by bringing the electrode close to the workpiece.

During welding, the following functions are active:

**Arc Force:** allows increasing the welding current to prevent the arc from extinguishing itself.

**Hot Start:** allows temporarily increasing the percentage of the welding current that the machine can force once the arc has been established.

This helps igniting the arc quickly and reliably.

**Antisticking:** allows decreasing the output current if the operator makes an error and sticks the electrode to the workpiece; this decrease allows removing the electrode from the holder without creating sparks which can damage the electrode holder.



The correct connection of the electrode holder and the ground cable is shown in line 1 of figure 5: in this way, the electrode holder is connected to the positive pole and the ground cable to the negative pole. Always check the correct connection on the electrode packet and, if necessary, invert them.

### 3.3.1 MANUAL MMA WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MMA procedure	
Manual Synergic	START BACK
	OPTIONS
	MMA

Once the selection has been made, the following welding screen opens:

Ready to weld	
> 151 A 26.0 V	START BACK MEM+
Arc Force 20% Hot start 20% Hot start t 0.5s	MMA Manual

Knob 9 shown in figure 1 allows regulating the welding current (thicker welding pieces require higher currents).

The other parameters shown in the figure can also be regulated via knob 10:

- Arc Force:** allows increasing the percentage of the current (proportional to the set current) that the welding machine can force in order to keep the arc well established.
- Hot Start:** allows increasing the percentage of the welding current (proportional to the set current) that the welding machine can force once the arc has been established.
- Hot start T:** allows setting the time in which the hot start current can be forced.

### 3.3.2 SYNERGIC MMA WELDING

To access this operating mode, turn knob 10 to make the selection shown in the figure.

Select MMA procedure	
Manual Synergic	START BACK
	OPTIONS
	MMA

Once selected, the display shows the page for selecting the type of electrode.

Select MMA procedure	
Rutile Basic Inox Cellulosic Aluminium	START BACK
	OPTIONS
	MMA Synergic

Once the type of electrode has been selected (by pressing knob 10), the page for setting the diameter of the electrode opens.

Select MMA procedure	
1.5mm 2.0mm 2.5mm 3.2mm 4.0mm 5.0mm 6.0mm 8.0mm	START BACK
	OPTIONS
	MMA Synergic

In this way, the welding process has all the data necessary for setting the correct value of the welding current.

Ready to weld		
> 56 A 26.0 v		START BACK MEM+
Arc Force	20%	MMA Synergic Basic 2.0mm
Hot start	20%	
Hot start t	0.5s	

Knob 9 shown in figure 1 allows fine-tuning the welding current.

The other parameters shown in the figure can also be regulated via knob 10:

- Arc Force:** allows increasing the percentage of the current (proportional to the set current) that the welding machine can force in order to keep the arc well established.
- Hot Start:** allows increasing the percentage of the welding current (proportional to the set current) that the welding machine can force once the arc has been established.
- Hot start T:** allows setting the time in which the hot start current can be forced.

## 4. POWER SUPPLY CONNECTION

Before connecting the machine, check the voltage, number of phases and frequency of the power supply. The power supply voltage allowable is indicated in the “Technical Specifications” section of this manual and on the machine’s nominal data label. Check that the welding machine has been correctly connected to the ground terminal. Also, check that the plug supplied with the machine is compatible with the local mains power outlet. Make sure there is sufficient power to run the machine. The “Technical Specifications” section of this manual contains information on the type of power supply protection devices to use. The machine comes with a special power cord (18 of Figure 2) which should not be extended. If an extension cord is necessary, use one that has the same or a larger cross-section than the machine’s power cord depending on the length of the cord. Use a “+” bipolar ground cord with a cross-section equal to or greater than 2.5 mm<sup>2</sup>.

## 5. OUTPUT CONNECTIONS

The welding cables are connected by means of a quick coupling system that uses special connectors.

### 5.1 CONNECTION FOR MIG WELDING WITH TRADITIONAL TORCH

- 1) Connect the ground cable to the appropriate “-” connector positioned on the front panel (12 of Fig 1). Align the key with the groove and insert; tighten the connector by turning it in a clockwise direction until it stops. Do not over tighten!
- 2) Connect the torch to the connector positioned on the front panel (15 of fig. 1) by turning it in a clockwise direction until it stops. Do not over tighten!

**Attention:** The machine comes with a standard MIG welding torch (Fig. 4).

This accessory will have a long duration if the periodic checks are conducted on the gas nozzle (Fig. 4A) and the wire-guide tip (Fig. 4B). These parts must be kept clean and intact. Replace the wire-guide when the wire does not slide properly.

### 5.2 CONNECTION FOR MIG WELDING WITH SPOOL OR PUSH-PULL TORCH

- 1) Connect the ground cable to the appropriate “-” connector (12 shown in figure 1). Insert by aligning the key with the groove and tighten by turning in a clockwise direction until it stops. Do not over tighten!
- 2) Connect the torch to the connector positioned on the front panel (15 shown in fig. 1) by turning it in a clockwise direction until it stops. Do not over tighten!
- 3) Connect the signal connector of the torch to the appropriate female jack (19).
- 4) Turn the tap (23 shown in figure 3) to the “MIG GAS” position (counter-clockwise direction).

If the Spool torch cannot be connected with connector 15 and therefore, it is not possible to proceed with step 2, follow these instructions:

- 1) Connect the ground cable to the appropriate “-” connector (12 shown in figure 1).

- Insert by aligning the key with the groove and tighten by turning in a clockwise direction until it stops. Do not over tighten!
- 2) Connect the torch cable to the “+” connector (11 shown in figure 1).  
Insert by aligning the key with the groove and tighten by turning in a clockwise direction until it stops. Do not over tighten!
  - 3) Connect the gas hose of the torch to the appropriate inlet (14 shown in figure 1).
  - 4) Connect the signal connector of the torch button to the appropriate female jack (13).
  - 5) Turn the tap (23 shown in figure 3) to the “TIG GAS” position (clockwise direction).

### **5.3 CONNECTION FOR TIG WELDING**

- 1) Connect the ground cable to the appropriate “+” connector positioned on the front panel (11 of Fig 1). Align the key with the groove and insert; tighten the connector by turning it in a clockwise direction until it stops. Do not over tighten!
- 2) Connect the torch to the “-” connector positioned on the front panel (12 of Fig. 1).
- 3) Insert by aligning the key with the groove and tighten by turning in a clockwise direction until it stops. Do not over tighten!
- 4) Connect the gas hose of the torch to the appropriate inlet (14 shown in figure 1).
- 5) Connect the signal connector of the torch button to the appropriate female jack (13).
- 6) Turn the tap (23 shown in figure 3) to the “TIG GAS” position (clockwise direction).

### **5.4 CONNECTION FOR MMA WELDING**

- 1) Connect the cable of the electrode holder to the “+” connector located on the front panel (11 of Fig. 1).  
Insert by aligning the key with the groove and tighten by turning in a clockwise direction until it stops. Do not over tighten!
- 2) Connect the ground cable to the appropriate “-” connector positioned on the front panel (12 of Fig 1). Align the key with the groove and insert; tighten the connector by turning it in a clockwise direction until it stops. Do not over tighten!
- 3) Turn the tap (23 shown in figure 3) to the “NO GAS” position (central position).

**Attention:** Some types of electrodes require the negative polarity on the electrode holder and the positive polarity on the ground cable: if so, invert the connection.

Make sure to follow the instructions on the electrode packet for the correct polarity!

## 6. INSTALLATION OF THE WELDING WIRE

Only for MIG welding: in case of MMA or TIG welding, skip this whole section.

Attention: Before installing the wire, always remove the gas nozzle (Fig. 4A) and the wire-guide tip (Fig. 4b) from the welding torch (Fig. 4).

1. Disconnect the power supply cord (18 of Fig. 2)
2. Unscrew the knob positioned at the centre of the spool holder (22 of Fig. 3), if necessary, remove the used spool.
3. Remove the plastic protection of the new spool and position the spool on the holding reel (22 of Fig. 3). Replace the knob. Remember that the Allen screw positioned at the centre of the reel is the braking system of the wire. Screw it to obtain the best braking condition: if tightened too much, it can cause too much braking which tends to block the motor of the wire-feeder. However, if not tightened enough, the wire may not stop immediately at the end of the welding process.
4. Unscrew the knobs of the wire-feeder (26 of Fig. 3) and turn them towards the outside. This lifts the upper wire-feeder rollers (28 of Fig. 3).  
Remove any wire remaining in the previous welding spool.
5. Insert the wire in the inlet tube (30 of Fig. 3) of the wire-feeder motor and let it slide under the wire-feeder rollers.
6. Lower the upper rollers (28 of Fig. 3) and close the plastic knobs (26 of Fig. 3) of the wire pressure regulator.  
Tighten gently; if too tight, the wire may block and cause damage to the motor; however, if too loose, the rollers will not be able to pull the wire.
7. Connect the power supply cord, turn on the switch (17 of Fig. 2) and press the wire advancement button (6 of Fig. 1).

At this point, the welding wire will slide into the torch cable. When it exits from the torch, release the button. Turn off the machine and replace the wire-guide tip (Fig. 4B) and gas nozzle (Fig. 4A) on the torch.

Attention: Keep the torch away from your face to prevent injuring yourself with the wire.

Attention: When in movement, the wire-feed rollers may crush your fingers.

N.B. Periodically check the state of the wire-feed rollers and replace them when they are worn out; failure to replace the rollers may compromise the correct feeding of the wire.

N.B. When changing the wire diameter, make sure the value corresponding to the diameter of the wire used is facing towards the outside of the machine. Remember that the rollers with a “V” shaped cavity are suitable for pulling iron or steel wires.

While, rollers with a “U” shaped cavity are suitable for aluminium wires.



## 7. CONNECTION OF THE GAS CYLINDER AND REGULATOR

Only for MIG and TIG welding. In case of MMA welding, skip this whole section.

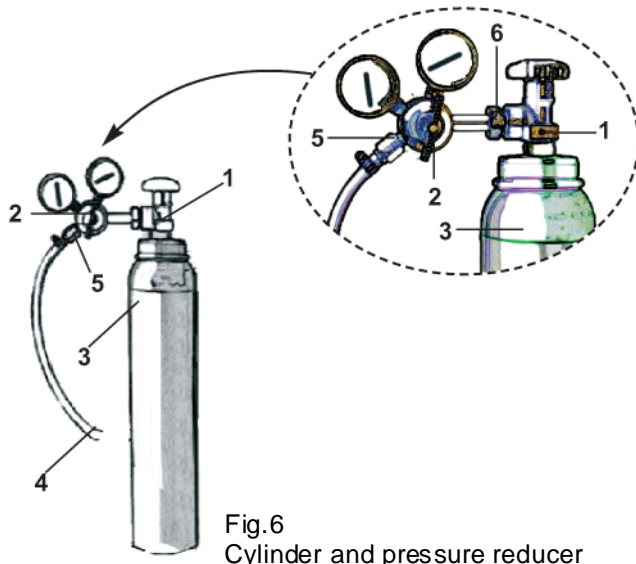


Fig.6  
Cylinder and pressure reducer

Before connecting the gas cylinder, first choose the most suitable type of gas for the welding to be executed. This section contains some recommendations.

### MIG WELDING OF CARBON STEEL:

For welding this type of material, use a welding gas mixture consisting of ARGON (80%) + CO<sub>2</sub> (20%). This gas mixture allows obtaining well-joined and aesthetically pleasing weld beads. Pure CO<sub>2</sub> can be used which will result in tight beads and more penetrating welds, but with a significant amount of spatter.

### MIG WELDING OF STAINLESS STEEL AND WELD BRAZING WITH CU-S13 WIRES:

For welding these types of materials, use a welding gas mixture consisting of ARGON (98%) + CO<sub>2</sub> (2%) or ARGON (98% min) + O<sub>2</sub> (2%).

### MIG WELDING OF ALUMINIUM:

For welding this type of material, use pure ARGON as a protection gas.

### TIG WELDING:

Before connecting the gas cylinder, check that it contains pure Argon gas. Do not use other gases.

### Refer to Figure 6 and carefully follow the procedure below:

1. Connect the pressure gauge (2) to the cylinder (3). Tighten the nut (6) connecting the gauge (2) to the cylinder (3). Be careful to not over tighten; too much force could damage the valve (1) of the cylinder.
2. Connect the gas hose (4) to the gauge (2) and secure with a pipe clamp (5).
3. Connect the other end of the gas hose (4) to the appropriate inlet positioned on the back of the machine (21 of Fig. 2), and secure with a pipe clamp.
4. Open the valve (1) of the cylinder (3). Press the torch button and check that the gas flows correctly.

**Attention:** The cylinders contain highly pressurised gas. Handle with care. Improper handling

could lead to serious accidents. Do not place the cylinders on top of each other and do not expose to excessive heat, flames or sparks. Do not allow the cylinders to strike against each other. Contact your gas supplier for more information on how to use and handle the cylinders.

**Attention:** Do not use the cylinder if you find oil leaks, grease or damaged parts. Immediately contact your gas supplier if these conditions exist.

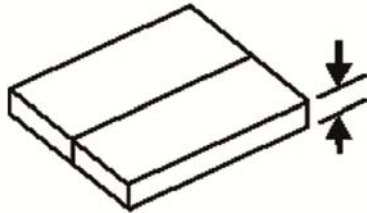
## 8. WELDING PROCESSES

### 8.1 Manual MIG welding

N.B. These instructions are for reference only and are applicable for welding thicknesses up to around 4 mm.

The regulation depends on the materials, wire thickness, connection, position and welding gas.

#### Step 1: Selection of the current



Convert the thickness of the material to be welding in Ampere (A) according to this proportion:  $0.025 = 1A$

e.g.  $3\text{mm} = 125A$

#### Step 2: Selection of the wire diameter

Ampere (Min-Max)	Wire diameter
40-90 A	0.6mm
60-140A	0.8mm
80-160A	1mm
100-200A	1.2mm

#### Step 3: Selection of wire speed

Wire diameter	Recommended value	Wire speed
0.6mm	90mm/min per ampere	$90 \times 120 = 11\text{m/min}$
0.8mm	50mm/min per ampere	$50 \times 120 = 6\text{m/min}$
1mm	40mm/min per ampere	$40 \times 120 = 5\text{m/min}$
1.2mm	30mm/min per ampere	$30 \times 120 = 3.5\text{m/min}$

#### Step 4: Selection of electronic inductance

Material	Regulation of electronic inductance
Ferrous materials (SG2 SG3)	min $\leftrightarrow$ med
Stainless steel (Ni-Cr)	Med
Aluminium (Al)	med $\leftrightarrow$ max
Copper-Silicone (Cu-Si3)	med $\leftrightarrow$ max
Copper-Aluminium (CU-Al8)	med $\leftrightarrow$ max

**Figure 7: Reference values for the current, wire diameter, wire speed and electronic inductance**

### To weld in MIG manual mode, follow these steps:

1. Set the welding current in relation to the thickness of the workpiece and the diameter of the wire using knob 9 shown in figure 1 (Step 1 of Fig. 7).

Display 16 of Fig. 1 shows the current value.

2. Depending on the current, select the diameter of the wire (Step 2 of Fig. 7).

3. Depending on the diameter of the wire, set the advancement speed using knob 10 of Fig. 1.

4. According to the material used, adjust the electronic inductance.

5. Connect the ground terminal to the workpiece.

6. Start welding keeping the length of the electric arc between 5 and 10 mm.

7. If necessary, adjust the wire speed (knob 10 of Fig. 1). To obtain the best welding result: adjust potentiometer 10 until you hear a strong and regular buzzing noise (similar to the sound of oil being fried).

It is recommended to carry out some test welds on a metallic sheet that has been removed of any coating, rust or paint.

To obtain the best results, follow these tips:

1. Keep the torch at a 45° angle from the workpiece. Keep the gas nozzle (Fig. 4A) at a distance of circa 6 mm from the workpiece.

2. Continuously move the torch.

3. Weld with a small zigzag movement in order to adjust the size of the weld bead to the desired value.

4. Do not weld in the presence of strong wind. Strong wind could carry the gas away from the weld pool which could lead to porous welding.

5. Keep the wire clean: never use rusty wires.

6. Do not bend or twist the torch cable.

7. When changing the wire spool, clean the wire-guide tube with compressed air.

8. Periodically remove any dust from the air inlets using low-pressure compressed air. Always direct the jet of air from the inside of the machine towards the outside in order to prevent dirt from being pushed inside the welding machine.

#### Pulsed Mode:

This operating mode is only for expert users: it is mainly used as an alternative to MIG-Synergic Pulsed welding in rare cases when, due to special type of materials, a satisfying result cannot be found using the pre-set programs.

In this operating mode, knob 9 of figure 1 sets the welding current.

Knob 10 of figure 1 sets all the other parameters as described in section 3.1.3.

## 8.2 Synergic MIG welding

Synergic MIG welding allows automatically adjusting the machine settings to the different materials and different thicknesses to be welded. Compared to manual welding, it has a pre-set program menu capable of satisfying practically any type of welding requirement.

However, as described in more detail below, a certain liberty is available for changing the parameter set automatically.

To weld in Synergic MIG mode, follow these steps:

1 – Depending on the material to be welded, select one of the following programs using Knob 10 shown in figure 1 (section 3.1.2):

- **FE**: this program is for welding with solid iron wire.
- **SS**: this program is for welding with stainless steel wire (Ni-Cr).
- **Al-Mg**: this program is for welding with aluminium magnesium wire.
- **Al-Si**: this program is for welding with aluminium silicone wire.
- **Al**: this program is for welding with aluminium wire.

- **Cu-Al:** this program is for welding with copper-aluminium wire.
  - **Cu-Si3:** this is for welding with Cu-Si3. This material is suitable for weld brazing, especially galvanised sheet-iron for automobiles.
  - **Inox A:** this program is for welding with flux-cored steel wire.
  - **Fe A:** this program is for welding with flux-cored iron wire.
- 2 – Set the diameter of the welding wire (section 3.1.2).
  - 3 – Set the thickness of the workpiece using knob 9 shown in figure 1 (section 3.1.2).
  - 4 – Connect the ground terminal to the workpiece.
  - 5 – Start to weld, keeping the electric arc at a length between 5 and 10 mm.
- This usually achieves a very good welding result; however, the result may require further fine-tuning, if so, proceed as follows:
- 6 – If too much incandescent material is generated, increase the inductance value by setting the appropriate parameter via knob 10 shown in figure 1 (section 3.1.2). If instead, there are difficulties in sustaining the arc, decrease the inductance value.

To obtain the best results, follow these tips:

1. Keep the torch at a 45° angle from the workpiece. Keep the gas nozzle (Fig. 4A) at a distance of around 6 mm from the workpiece.
2. Continuously move the torch.
3. Weld with a small zigzag movement in order to adjust the size of the weld bead to the desired value.
4. Do not weld in the presence of strong wind. Strong wind could carry the gas away from the weld pool which could lead to porous welding.
5. Keep the wire clean: never use rusty wires.
6. Do not bend or twist the torch cable.
7. When changing the wire spool, clean the wire-guide tube with compressed air.
8. Periodically remove any dust from the air inlets using low-pressure compressed air. Always direct the jet of air from the inside of the machine towards the outside in order to prevent dirt from being pushed inside the welding machine.

### 8.3 MMA WELDING

Diameter (mm)	Current (A)
1.6	35-50
2.0	40-70
2.5	60-100
3.25	80-140
4.0	120-170
5.0	180-250

**Fig. 8: Welding currents in relation to the electrode diameter**

To weld in MMA manual mode, follow these steps:

1. Select the manual MMA welding mode as described in section 3.3.
2. Using knob 9 shown in figure 1, set the welding current in relation to the type of electrode and thickness of the workpiece (the current value set appears on the display). Figure 8 shows the indicative current values suitable for the various electrode diameters: however, always check to see if different values are reported on the electrode packet.
3. Connect the ground terminal to the piece to weld.
4. Position the electrode in the electrode holder.
5. Start to weld keeping a distance of 3-4 mm between the electrode and the workpiece. Weld with a small zigzag movement in order to adjust the size of the weld bead to the desired value.
6. To end the welding process, interrupt the arc by moving the electrode away from the workpiece.



To weld in **Synergic MMA** mode, follow these steps:

1. Select the Synergic MMA welding mode as described in section 3.3.
2. Set the type of electrode using knob 9 shown in figure 1 (section 3.3.2).
3. Connect the ground terminal to the piece to weld.
4. Position the electrode in the electrode holder.
5. Start to weld keeping a distance of 3-4 mm between the electrode and the workpiece. Weld with a small zigzag movement in order to adjust the size of the weld bead to the desired value.
6. To end the welding process, interrupt the arc by moving the electrode away from the workpiece.

**Attention:** If using “Basic” electrodes, before resuming an interrupted welding process, remove any excess from the protection cover by tapping the electrode on a metallic surface (otherwise, it will not be possible to re-establish the welding arc).

## **8.4 TIG WELDING**

To weld in TIG mode, follow these steps:

1. Select the TIG program via knob 9 shown in figure 1.
2. Using this knob, select Lift-Arc or Pulsed Lift Arc program.
3. Set the welding current via knob 10 shown in figure 1.
4. Connect the ground terminal to the workpiece.
5. Press the torch button in order to start the gas flow and regulate the flow via the tap positioned on the cylinder (indicatively, 6 litres/minute).
6. Rest the ceramic of the torch on the workpiece and turn in order to bring the tungsten electrode in contact with the workpiece.
7. Slowly lift the tip of the tungsten electrode from the workpiece using the ceramic end of the TIG torch as a lever.
8. Once the arc has been established, the current gradually rises until it reaches the set value.
9. Start to weld keeping the same distance from the weld pool that is being created.

## 9. REPLACEMENT OF SHEATH INSIDE THE TORCH CABLE

Follow these instructions to replace the sheath of the wire guide:








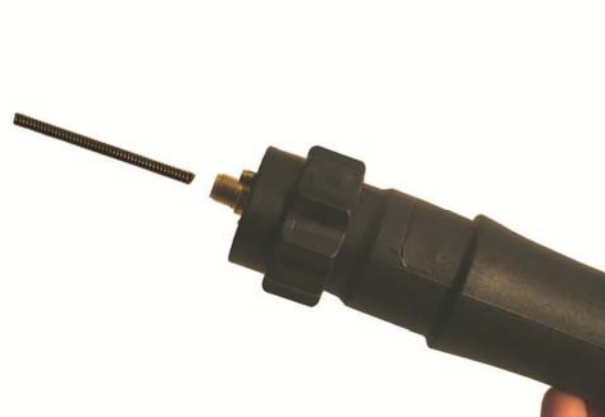
<ul style="list-style-type: none"><li>• Torch side: remove gas nozzle (A)</li><li>• Unscrew the wire-guide tip (B)</li></ul>		
 A	 B	 C
<ul style="list-style-type: none"><li>• Connector side (C): unscrew the end nut (D, E) and take hold of the end of the sheath with some pliers and start to extract it (F).</li><li>• Complete the extraction of the sheath (G)</li></ul>		
 D	 E	 F
<ul style="list-style-type: none"><li>• Insert the new sheath and push it all the way down (H).</li><li>• Re-screw the wire-guide tip (B) onto the torch.</li><li>• Complete by re-screwing the gas nozzle (A).</li></ul>		
 G		 H

Figure 9: Replacement of wire-guide sheath

## 10. REMOTE CONNECTION

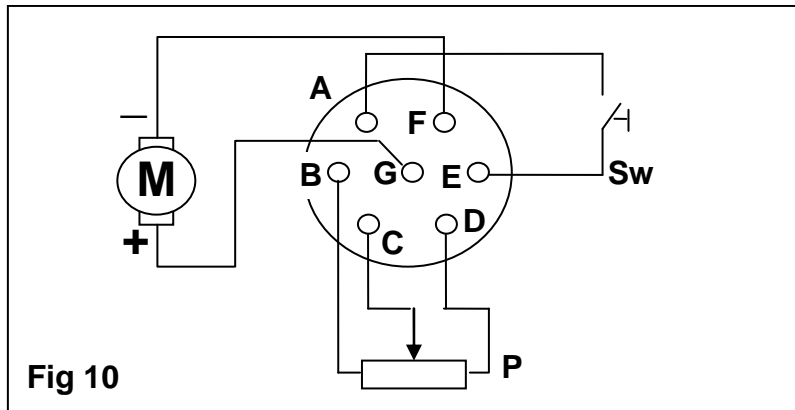


Figure 10 shows the connections of the remote connector (13 shown in figure ).  
Where:

Sw is the torch button  
P is the potentiometer for controlling the current  
M is the external wire-feeder motor

### 11.1 MIG WELDING WITH STANDARD TORCH

The connector is not used because all the necessary contacts are made using Euroconnector 13 shown in figure 1.

### 11.2 MIG WELDING WITH SPOOL OR PUSH-PULL TORCH

If using a Spool torch supplied by Fimer, the connection to the remote connector is direct. If not, connect the two wires of the torch button to terminals A and E of the connector, the negative of the torch's wire-feeder motor to terminal F and the positive to terminal G (as shown in figure 10).

Some types of torches also allow regulating the welding power at a distance.

Turn the potentiometer on the torch to set the welding power in a range between zero and the set value.

This requires connecting the potentiometer (P) to the torch as shown in figure 10.

The value of the potentiometer is not critical: components between 2.2kOhm and 10kOhm 1/2W can be used.

### 11.3 TIG WELDING

Connector 13 in Figure 1 connects the torch's welding button to the machine by means of terminals A and E shown in figure 10.

The connection is made automatically by connecting the TIG welding torch.

### 11.4 MMA WELDING

Remote connector 13 shown in figure 1 allows bringing the current regulation close to the welding point.

This requires connecting the potentiometer (P) to the torch as shown in figure 10.

The value of the potentiometer is not critical: components between 2.2kOhm and 10kOhm 1/2W can be used.

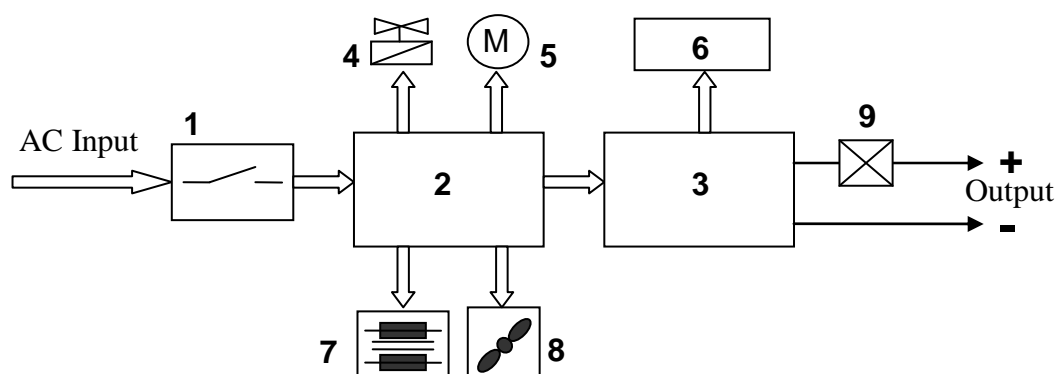
Turn the potentiometer on the torch to set the welding current in a range between zero and the set value.

# 11. TROUBLESHOOTING

The most common problems you may encounter and the relative solutions are listed below.

DEFECT	CAUSE	SOLUTION
Machine turns off [Display: OFF] [Display: network error]	1) No power on the mains power source 2) Check the mains voltage	1) Restore the mains power 2) Restore the mains power
The machine suddenly stops operating after prolonged use [Display: temperature rise or overheating of inverter]	1) The machine has overheated due to excessive use and the thermal protection has kicked in	1) Let the machine cool down until the error message disappears
The machine does not work [display: inverter under power]	1) MIG: Short circuit on the welding torch 2) MMA: electrode in contact with the ground connection	1) Check the torch 2) Move the electrode away from the ground connection
The wire does not advance when the wire-feed roller turns.	1) Dirt on the wire-guide tip. 2) Too much friction on the spool 3) Faulty torch	1) Blow with air; replace nozzle 2) Loosen 3) Check the wire-guide sheath
Wire works in jerks or sporadically	1) Faulty gas nozzle 2) Burning in the gas nozzle 3) Dirt on the throat of the wire-feed roller 4) Throat of the wire-feed roller worn	1) Replace 2) Replace 3) Clean 4) Replace
No arc	1) Bad contact between the ground clamp and the workpiece 2) Short circuit between the contact nozzle and the gas guide tube	1) Tighten the clamp and control 2) Clean or replace the contact nozzle and wire-guide nozzle.
Porous weld bead	1) No gas shield due to encrustations in the gas nozzle. 2) Incorrect angle distance of the torch 3) Not enough gas 4) Wet pieces 5) Welding arc too long	1) Remove the encrustations 2) The distance between the torch and the piece must be 5-10 mm; the angle must not be less than 60° in respect to the workpiece. 3) Increase the quantity 4) Dry with a hot air pistol or other instruments 5) Shorten the arc
Hot cracks	1) Pieces dirty 2) Welding with very high thermal input 3) Poor quality welding wire 4) Base materials with elevated quantities of carbon, sulphur and other impurities.	1) Clean 2) Reduce the welding current 3) Change the welding wire
Low penetration	1) Current too low 2) Irregular wire power supply 3) Major differences in the edges 4) Bevel too small	1) Increase the current 2) See previous points
Low melting rate	1) Brusque movements of the torch 2) Incorrect inductance value 3) Oxidized material	1) Move the torch continuously 2) Change the inductance value 3) Clean
Side incisions	1) Welding speed too fast	1) Reduce the welding speed
Breaks	1) Unsuitable type of wire 2) Poor quality of the workpieces	1) Change the type of wire
Too much spatter	1) Current too high 2) Incorrect inductance value 3) Torch too angled	1) Reduce the current 2) Increase the inductance 3) Straighten the torch
[display: no SD card]	1) The SD card was removed	1) Insert the SD card
[display: low water pressure]	See the manual of the cooling unit	

## 12. BLOCK DIAGRAM



- 1 Input switch
- 2 Input and control power board
- 3 Power module
- 4 Solenoid valve
- 5 Wire-feeder motor
- 6 Display
- 7 Auxiliary transformer
- 8 Fans
- 9 Current sensor (mounted on block 2)

## 13. MEMORISATION OF THE WORKING POINT

As illustrated in the previous sections, the welding machine allows significantly personalising the working point (in both manual operation and synergic operation).

The best working point for a workpiece can be saved in the memory and quickly retrieved later. Follow these instructions to save a new working point:

Ready to weld	
<div style="display: flex; justify-content: space-between;"> <span>&gt;</span> <span>96 A</span> </div> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">             Save with name [ABCD ]           </div> <div style="display: flex; justify-content: space-between;"> <span>Wire speed 3.0m/'</span> <span>MIG-MAG</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Inductance 5.0</span> <span>S.A.M.</span> </div> <div style="display: flex; justify-content: space-between;"> <span>2/4 strokes 2t</span> </div> <div style="display: flex; justify-content: space-between;"> <span>P1/2</span> </div>	<div style="display: flex; justify-content: space-between;"> <span>&lt;</span> <span>&gt;</span> </div> <div style="display: flex; justify-content: space-between;"> <span>back sp</span> <span>OK</span> </div>

- 1 - Press the MEM+ key (4 in figure 1).
  - 2 - Turn knob 10 (figure 1) to select the first letter of the name in which you want to save the working point.
  - 3 - Press knob 10 to confirm the selection of the letter.
  - 4 - Repeat steps 2 and 3 until the entire name has been spelled out.
  - 5 - Confirm the name by pressing the "OK" key.
- From this moment onwards, the working point is memorised with its own name and is displayed together with the other welding procedures.

Meaning of the buttons:

**back sp**: cancels the last letter entered.

**>**: moves the cursor to the right

**<**: moves the cursor to the left

**OK**: confirms the name of the working point

Per RAEE s'intendono i rifiuti di Apparecchiature Elettriche ed Elettroniche (AEE) incluse di tutti i componenti i sottosistemi ed i materiali di consumo che sono parte integrante del prodotto nel momento in cui si assume la decisione di disfarsene. La Legislazione prevede la suddivisione in 2 categorie principali chiamate RAEE PROFESSIONALI o RAEE DOMESTICI.



Per RAEE PROFESSIONALI s'intendono tutti i rifiuti di apparecchiature elettriche ed elettroniche destinate ad uso prettamente industriale.

Per RAEE DOMESTICO s'intendono tutti i generatori ad alimentazione monofase con corrente di uscita MAX  $\leq$  200A con i loro accessori.

Per lo smaltimento di un RAEE DOMESTICO si avranno 2 possibilità:

a) Nel caso si decidesse di comprare una nuova apparecchiatura equivalente l'utilizzatore potrà consegnarlo al distributore il quale dovrà ritirarlo gratuitamente.

b) Dovrà depositarlo nella piazzola Comunale, nel contenitore o apposita area identificata come "RAGGRUPPAMENTO 4". Per lo smaltimento di un RAEE PROFESSIONALE alla data di redazione del Manuale di istruzioni non essendo ancora definitiva l'applicazione della Normativa si prega di contattare il distributore e/o il costruttore per informazioni in merito allo smaltimento.

ALLA DATA DELLA REDAZIONE DEL PRESENTE MANUALE D'ISTRUZIONI QUESTE INFORMAZIONI SONO DA RITENERSI NON DEFINITIVE IN QUANTO SUCCESSIVAMENTE POSSIBILI MODIFICHE SECONDO GLI OBBLIGHI LEGATI AL DECRETO LEGISLATIVO N° 151/2005 CHE OTTEMPERA LA DIRETTIVA 2002/96/CE.

This product contains electrical or electronic materials.



The presence of these materials may, if not disposed of properly, have potential adverse affects on the environment. Presence of this label on the product means it must not be disposed of in normal household waste and must be disposed of separately.

As a consumer you are responsible for ensuring that this product is disposed of properly. If your supplier offers a disposal facility please use it or alternatively contact your local authority/council to find out how to properly dispose of this product.

Nur für EU-Länder



Werfen Sie Elektrogeräte nicht in den Hausmüll

Gemäß Europäischer Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte und Umsetzung in nationales Recht müssen verbrauchte Elektrowerkzeuge getrennt gesammelt und einer umweltgerechten Wiederverwertung zugeführt werden.

No tirar nunca los aparatos eléctricos junto con los residuos en general!



De conformidad a la Directiva Europea 2002/96/EC relativa a los Residuos de Equipos Eléctricos o Electrónicos (RAEE) y al acuerdo de la legislación nacional, los equipos eléctricos deberán ser recogidos y reciclados respetando el medioambiente.

Como propietario del equipo, deberá informar de los sistemas y lugares apropiados para la recogida de los mismos.

Aplicar esta Directiva Europea protegerá el medioambiente y su salud!

Ne pas jeter les appareils électriques avec les déchets ordinaires!



Conformément à la Directive Européenne 2002/96/EC relative aux Déchets d'Équipements Électriques ou Électroniques (DEEE), et à sa transposition dans la législation nationale, les appareils électriques doivent être collectés à part et être soumis à un recyclage respectueux de l'environnement.

En tant que propriétaire de l'équipement, vous devriez vous informer sur les systèmes de collecte approuvés auprès nos représentants locaux.

Appliquer cette Directive Européenne améliorera l'environnement et la santé!

Данное изделие содержит электрические и электронные компоненты.



Наличие данных материалов может представлять собой, при ненадлежащей утилизации изделия, потенциальную угрозу для окружающей среды. Наличие данной маркировки на изделии указывает на то, что последнее не может быть утилизировано вместе с обычными бытовыми отходами и подлежит утилизации отдельно от других отходов.

В качестве потребителя на вас лежит ответственность за обеспечение надлежащей утилизации данного изделия. Используйте оборудование для утилизации, если таковое предоставляется вашим поставщиком или, в качестве альтернативы, связывайтесь с вашими органами местного управления/городским советом для определения способа надлежащей утилизации данного изделия.

YOUR BRAND, YOUR WELDING



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